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Shanti Swarup Bhatnagar Prizes: 1980

Ten scientists have been named for the Shanti Swarup Bhatnagar Prizes for the year 1980. The recipients of the awards in the various disciplines are as follows:

Physical Sciences: Prof. N. Mukunda, Indian Institute of Science, Bangalore, and Dr N.S. Satya Murthy, Bhabha Atomic Research Centre, Bombay

Biological Sciences: Prof. Asis Datta, Jawaharlal Nehru University, New Delhi, and Dr. J.S. Singh, Kumaun University, Nainital

Engineering Sciences: Dr V.S. Arunachalam, Defence Metallurgical Research Laboratory, Hyderabad

Medical Sciences: Dr P.R. Adiga, Indian Institute of Science, Bangalore, and Prof. T. Desiraju, National Institute of Mental Health and Neuro Sciences, Bangalore

Mathematical Sciences: Prof. R. Sridharan, Tata Institute of Fundamental Research, Bombay

Earth Sciences: Dr J.G. Negi, National Geophysical Research Institute, Hyderabad, and Prof. B.K. Sahu, Indian Institute of Technology, Bombay.

No award has been given in chemical sciences for 1980. □

CSIO Develops Fresnel Lens Technology

By developing technology for the production of Fresnel lenses, the Central Scientific Instruments Organisation (CSIO), Chandigarh, has achieved a breakthrough towards harnessing solar energy. The most important application of Fresnel lenses is as solar energy concentrators. In conjunction with the solar cell, it converts solar radiations into electrical energy and thus forms a complete solar panel capable of harnessing solar energy for industrial and commercial uses.

Fresnel lenses also find wide applications as condensers of luminous flux in overhead projectors, X-ray photo projectors, railway and road signalling equipment, airport lighting and landing systems, TV screens and in reflex camera screens. These are always preferred to conventional glass condensers where space, weight and cost are the limiting factors.

Fresnel lens being a highly commercialized item, its technology has been a closely guarded secret of a few firms in the developed countries, and hence the development of the technology by CSIO was beset with several problems. The programme called for multi-disciplinary approach involving mechanical engineering, electroforming, surface finishing of accurately grooved profiles, casting of metals, specially bi-metals, treatment of plastics, and lastly, plastic moulding techniques. In each of these activities, considerable amount of experimentation in terms of materials, methods and formulations was involved.

The initial approach was that of making Fresnel lens master by direct machining from the given data. To achieve this, a number of jigs and fixtures were designed and fabricated. However, owing to the non-availability of precision computerized machines as also proper materials and tools (their import meant huge investments to the tune of Rs 10-15 lakh), this approach had to be abandoned in favour of the approach based on replication techniques. Though basically not as good as the first one, the replication technique seemed promising, quick and economically viable. In this technique, a true replica of a Fresnel lens whose master is required to be developed, is obtained by electroforming process. The thin electroform is suitably backed, machined, polished, surface-finished and deployed as a master.

During the development process at CSIO, the die part was elaborately designed, fabricated and tested successfully in actual runs. It had a built-in heating and cooling system. The moulding of plastic lenses was done with the help of this die on a hydraulic press of 250 tonnes capacity.

Solar energy being a most promising and potential alternative to petro-energy, the need for a Fresnel lens is obvious. The technology developed by CSIO goes a long way in helping the Central Electronics Engineering Research Institute, Pilani, in its DST-sponsored project on the development of solar cells.

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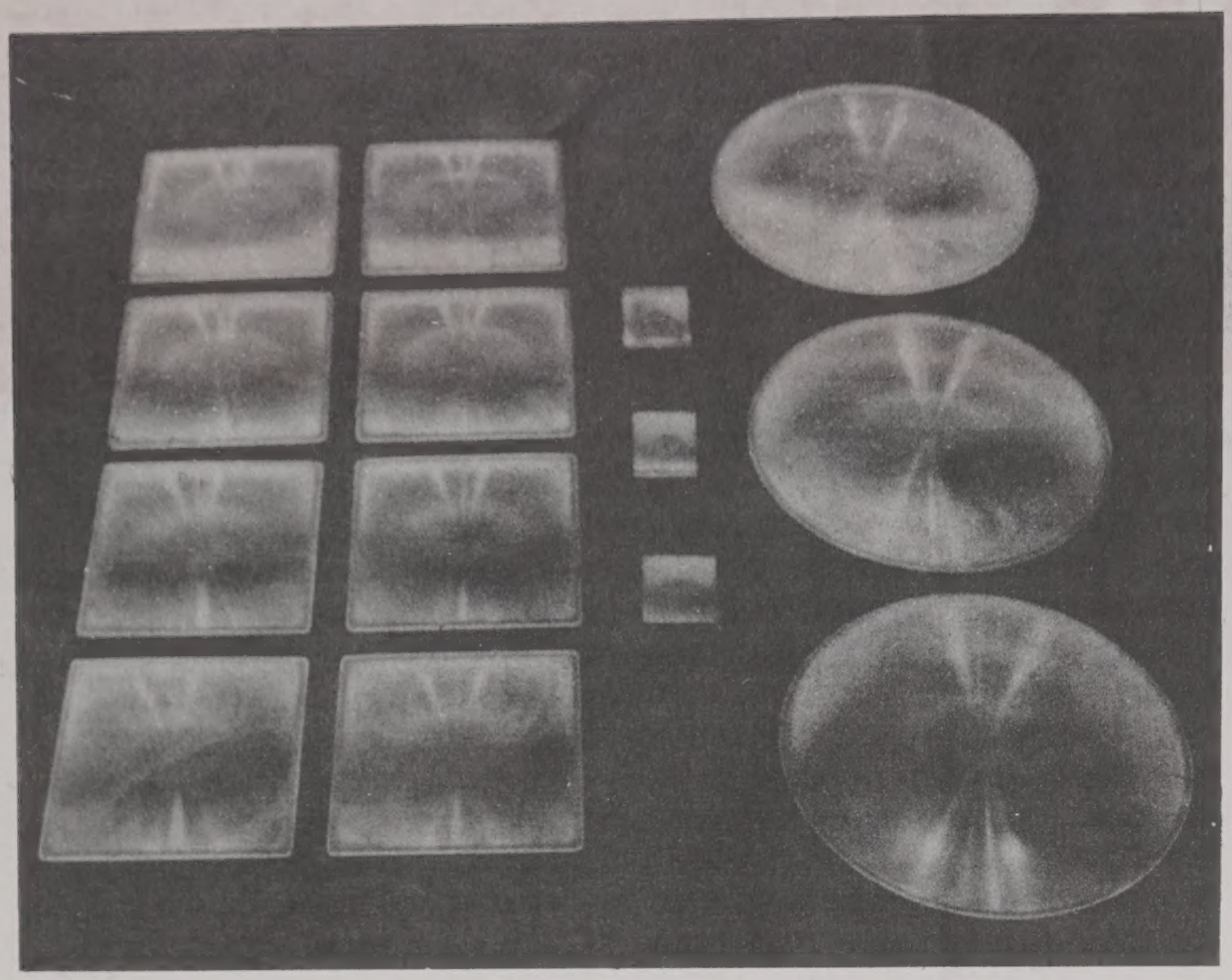


Fresnel lenses of varied specifications developed at CSIO

The lens moulded from one of the masters, meant for use as a solar energy concentrator, has the following specifications:

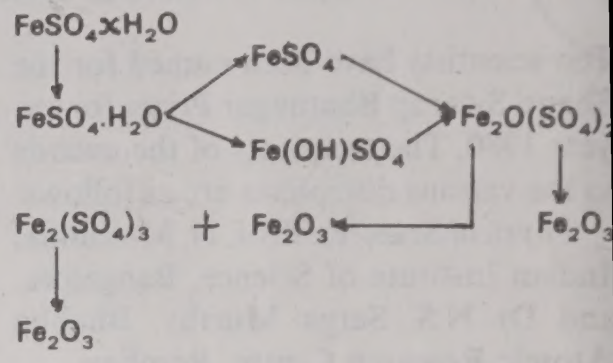
Focal length	:	215 mm ± 2%
Pitch of grooves	:	0.5 mm
Overall size	:	160 mm sq.
Grooved area	:	150 mm sq.
Weight of lens	:	70 g (approx.)
Material used	:	acrylic plastic
Characteristics	:	n_D, 1.489; V, 57.8; transmittance, 92% visible
Patch size of luminous flux at focus	:	5 mm
Temperature record of solar disc of mid-day cloudless September sun	:	(i) over 1 mm centre at focus ≃ 1000°C, (ii) over the edge of patch ≃ 650°C.

The estimated cost of one Fresnel lens of the specifications given above is Rs 14 vs Rs 100 –the landed cost of an imported piece. □

Chemistry of Iron Sulphates

Ferrous sulphate heptahydrate is an industrial byproduct obtained during pickling of steel with sulphuric acid. Its production far exceeds the demand and hence there is a need to convert it into more useful products. Roasting of ferrous sulphate in air under controlled conditions gives ferric oxide and sulphur oxides. Reaction of ferrous sulphate heptahydrate with soda ash at elevated temperatures results in the formation of sodium sulphate and red oxide of iron. Both the above reactions are used in industry to produce iron oxide red pigment. A detailed study of the kinetics, mechanism, and thermochemistry of roasting of ferrous sulphate and double decomposition reactions of heptahydrate with alkali and alkaline earth carbonates is of considerable interest in understanding the production of good-quality pigment. Different views have been expressed in the literature on the formation of intermediates during the thermolysis of ferrous sulphates. This is probably due to different experimental conditions and different purities of the starting materials. The decomposition of ferrous sulphate with and without alkali/alkaline earth carbonates has been studied by Shri M.S.R. Swami at the Regional Research Laboratory (RRL), Bhubaneswar.

For the study, different hydrates o ferrous sulphate, and basic ferr sulphates were prepared in pure for and their compositions ascertaine before subjecting them to therma decomposition. Dynamic thermal stu dies were carried out using a de rivatograph. The hydrates underwen dehydration cum oxidation decomposition in the following manner



Thermochemical and kinetic parameters, viz. heats of reaction, heats of formation, activation energy, frequency factor, rate constant, activation entropy, and mechanistic equations were evaluated using differential thermal analysis and thermogravimetry.

Shri Swami, presently with Electrical Research and Development Association, Vadodara, was awarded the Ph.D. degree of Utkal University for his thesis based on the work, carried out under the guidance of Dr B.R. Sant (RRL, Bhubaneswar). □

CCDS Membership for NPL

The National Physical Laboratory (NPL), New Delhi, was elected a member of the Consultative Committee on the Definition of Second (CCDS) at a meeting of the International Committee on Weights and Measures (CIPM) held at Paris in October 1980. This recognition has come in view of the outstanding work done in time and frequency standards at NPL in the recent past. The consultative committee has a limited international membership and the selection is made on the basis of contribution made by each individual member to the field of time and frequency. CCDS works in close collaboration with the International

Radio Consultative Committee (CCIR) and International Bureau of Time (BIH). □

Pan Growers' Meet: NBRI

The problems facing pan (betel vine) cultivation, especially the huge losses due to diseases and natural calamities, and the efforts towards solving them by the National Botanical Research Institute (NBRI), Lucknow, and the Uttar Pradesh State Council of Science and Technology were discussed at a Betal Vine Growers' Meet. The meet was organized under the auspices of Pan Growers and Traders Association and Bundelkhand Vikas Parishad, Mahoba, and in collaboration with NBRI Lucknow, and Uttar Pradesh State Council of Science and Technology (UPCST), at Mahoba (Uttar Pradesh) on 21 November 1980. The meet was attended by over 600 cultivators and traders of pan from Mahoba, Garhi Malhara and Chattarpur, besides district officials and scientists from NBRI and UPCST.

Highlighting the contributions of NBRI on the betel vine cultivation, the NBRI's Director Dr T.N. Khoshoo informed the gathering that betel vine was being cultivated over an area of 30,000 ha, producing leaves worth Rs 670 crore. Considering its importance as a commercial cash crop, the state government and the central government had taken steps to augment research on various problems of betel vine cultivation. A comprehensive survey conducted in the area by NBRI had identified the main problems as: fungus diseases, like foot, stem and leaf rot, which accounted for 60% damage to the betel vine plantation; nonavailability of proper manures owing to inadequate practical experience and lack of experimental evidence for response of vine to nutrient elements; and poor storage facilities and uneconomic returns because of poor keeping quality; and wide fluctuations in the price.

Dr Khoshoo added that NBRI had already collected 74 cultivars and research was in progress to screen the germplasm against established pathogens, to test the efficacy of fungicides in controlling fungal diseases, to study the response to fertilizers, and to improve quality as also to conduct technoeconomic surveys.

Dr A.N. Singh, Head, Natural Resources Division, UPCST, appreciated the results emanating from the UPCST-sponsored scheme on betel vine and exhorted the farmers to avail themselves of the technical advice rendered by NBRI scientists to modernize betel vine cultivation.

Shri Santlal, Additional District Magistrate, and Shri P.N. Singh, Development Officer, Hamirpur, said that the state government had already decided to bring pan cultivation under the Drought Prone Area Programme and to extend to pan growers all benefits and concessions enjoyed by other farmers; the latter appreciated NBRI's efforts in betel vine research.

Dr K.M. Vyas of the Sagar University stressed the need for use of disease-free planting material, periodic drenching of soil with copper fungicides, and judicious use of fertilizers.

The participants were shown round the pictorial exhibition put up specially for the occasion by NBRI. □

Conference Briefs

Eleventh Biennial CSC Meeting

Dr G. Thyagarajan, Director, Regional Research Laboratory (RRL), Jorhat, who represented the Director General of CSIR at the eleventh biennial meeting of the Commonwealth Science Council (CSC) held in Nairobi from 15 to 26 September 1980, reports that the meeting reviewed the progress of eight coordinated R&D programmes launched under CSC's auspices. India is an active participant in Metrology (Asia/Pacific) Programme* through Dr A.R. Verma, Director, National Physical Laboratory, New Delhi, and in Mineral Resources and Geology Programme through Director General, Geological Survey of India. Dr Thyagarajan represents India on the steering committee of Rural Technology (Asia/Pacific) Programme and is also chief coordinator of the project on Management of Water Hyacinth launched by CSC with financial assistance from UNEP. The other programmes relate to standardization and quality control, alternative energy and natural products, involving African and Caribbean countries.

The Water Hyacinth project, in which India is playing a leading role, received much attention as a model of technical cooperation among the countries. The progress in this inter-country project, notably in conversion of water hyacinth into saleable papers and paperboards achieved by RRL, Jorhat, was highly commended and cited.

Among the new projects discussed at the meeting were: Research Management and Administration and Commonwealth Science and Technology Fellowship Scheme. The meeting recommended that an in-depth evaluation of the workshop on Research Management and Administration, held in Kuala Lumpur in December 1979, be carried out and necessary follow-up actions taken. It may be mentioned that Dr S.R. Valluri and Dr P.K. Rohatgi of CSIR had participated in the Kaula Lumpur workshop.

On the CSC executive committee India completed its term of two years and gave place to Bangladesh. The next CSC meeting will be held in Malaysia. □

*[*see* CSC Steering Committee Meeting on Metrology Programme, *CN*, 30 (1980), 191].

Grain Conservation and Processing: Indo-Mexican Symposium

Under the joint programme in the field of science and technology between CSIR (India) and CONACYT (Mexico), a symposium and a training course on Grain Conservation and Processing were held in Mexico City during October 1980. The Indian delegation,

which participated in the symposium, consisted of Shri C.P. Natarajan, Shri S.K. Majumdar and Dr H.S.R. Desikachar, all from the Central Food Technological Research Institute (CFTRI), Mysore.

The technical sessions of the symposium discussed: Harvesting, handling and storage of grains; Rodent research and control, and infestation control and pesticides; Processing of grains for food and feed; Milling engineering, design and manufacture of milling equipment; and Technology development for coffee, cocoa and spices. Twenty-six Mexican delegates from different institutions participated; the Indian delegation presented ten papers. The technical sessions were followed by a valedictory function under the chairmanship of Ing. Guilerno Funes Rodriguez, Chairman of Biotechnology, Universidad Autonoma Metropolitana, Iztapalana, and Shri Natarajan, CFTRI's Director and leader of the Indian delegation, during which the symposium made several recommendations.

One of the recommendations was that India and Mexico could undertake joint collaborative projects aimed at evolving methodology for assessing the qualitative losses in stored and infested food grains. The symposium called for the sharing of Indian experience in reducing food losses due to insects, pests, moulds, and rodents. For improving the existing rural storage systems and warehouses with low-cost technologies, the symposium recommended the implementation in both the countries of the Mexican proposal to adopt the new plastic structures with built-in solar drying systems so that the experiences could be shared for mutual benefit. Indian researches relating to non-toxic protectants, such as activated clay, vitaminized tricalcium phosphate, rodent repellent formulations and related products and technologies, the symposium recommended, could be experimented upon under Mexican conditions through collaborative arrangements.

With regard to rice, Indian experience in harvesting, threshing, drying, milling and parboiling could be shared by Mexico, the symposium suggested. As sorghum and garbanzo (chick-pea) are widely used in India as human food, the symposium observed that Indian technology of pearling of sorghum and dehusking and puffing of chick-pea could prove useful to Mexico. Legume milling was another technology which could be shared between India and Mexico.

Low-cost weaning foods based on locally available cereals, legumes and millets and comparable in nutritional value to those based on milk could be developed to cater to the needs of children in lower income groups, particularly in rural areas, the symposium recommended. Emphasizing the need in Mexico for equipment for handling and processing grains on a small scale in rural areas, the symposium observed that Mexico could benefit from Indian experience in the design and operation of small and medium scale grain processing equipment, which would be appropriate for developing agro-industries.

The symposium also observed that the automatic tortilla making equipment used in Mexico could be useful to India for mechanization of *chapati* making; so also the abrasion rice polisher used in Morelos.

Observing that there is scope for exchange of information on the cultivation and processing of coffee, cocoa and spices between the two countries, the symposium felt that India could contribute to the development of spice technology.

By identifying several areas where Mexico could share Indian experience the symposium revealed that Indian expertise in grain storage and processing technology is held in high esteem abroad.

Course on Food Grain Storage, Pest Control, and Grain Milling Technology

The course, conducted by Shri Majumdar and Dr Desikachar, from 20 to 24 October 1980, was attended by 80 participants. It included the following topics: Assessment of food losses; General techniques of grain milling; Problems associated with rice milling; Storage structures for food grains; Fumigants and fumigation techniques for sub-tropical and tropical countries; Milling of maize and coarse grains for food uses; Legume milling technology; Rodents and their control; Non-toxic pesticides and food protectants; and Nutrition and convenience foods based on cereals and legumes. □

Unesco Regional Seminar on Information Technology

Shri A.S. Raizada of the Indian National Scientific Documentation Centre (Insdoc), New Delhi, participated and directed, on invitation, a seminar on the applications of information technology for library and information processing in the disciplines of science and technology at Manila during November 1980. The seminar was held in collaboration with the School of Library Science, University of Philippines and Unesco National Commission of Philippines for the countries mainly belonging to South East Asia region. The seminar discussed an integrated approach to concepts like computerized processing, auto-indexing and abstracting, reprographic technology and telecommunication technology involving satellite communication and computer networks. It included lectures on various techniques, description of application program packages, demonstrations for searching of remotely located data bases and other computer capabilities in the areas of data base creation and library processing of information in science and technology.

The seminar was attended by 30 participants belonging to the countries of the region including Bangladesh, China, India and Sri Lanka. □

Deputation Briefs

Dr V.N. Bindal of the National Physical Laboratory (NPL), New Delhi, visited

land, UK and France from 15 otember to 30 October 1980 under the entists' exchange programme be- een CSIR and the corresponding dies of these countries. The aim of his it was to survey the facilities and rk in the field of ultrasonics at the stitute of Fundamental Technological search (IFTR) of the Polish Academy Sciences (PAS), Warsaw, and to ntify the areas for joint scientific llaboration between IFTR (PAS) and PL (CSIR) in the field of ultrasonics. As a result of deliberations with a m of Polish scientists, which included of. I. Malecki, Director General, and of. J. Ranachowski, Deputy Director, TR, and other senior officials, it was cided that a programme of joint work r the next five years (1981-85) may be anned. A detailed programme for the st three years was worked out and gned at the first instance. The areas hich were identified for joint scientific operation include: (1) Development instrumentation/equipment for the easurement of ultrasonic velocity, tenuation and viscoelastic measure- ent; (2) Development of piezoelectric ramic materials for ultrasonic trans- ucers and devices; (3) Development of cilities for the assessment of ultrasonic uipment/transducer performance; (4) alibration of ultrasonic fields; and (5) evelopment of acousto-optics and rface wave transducer devices.

It was also decided that IFTR would ovide, free of cost or at nominal cost, me of the ultrasonic equipment/ struments manufactured by its xperimental Department ECHPAN) for testing at NPL and aluate their performance under dian climatic conditions.

During his four-week stay in Poland, r Bindal also visited some of the stitutes engaged in the area of trasonics and had discussions with rof. A. Opilski, Director, Institute of nysics, Gliwice; Prof. A. Yuszkiwicz, irector, Institute of Chemistry, racow; and Prof. A. Sliwinski, irector, Institute of Physics, Gdansk.

Dr Bindal also visited some of the institutes in UK and France to get acquainted with the recent advances in ultrasonics. In UK he met Dr R.W.B. Stephens, Chelsea College, London; Dr J. Szilard, University of Technology, Loughborough; Dr J.P. Woodcock, Bristol General Hospitals, Bristol; and Dr C.R. Hill, Institute of Cancer Research, Sutton. In France he visited University of Pierre and Marie Curie, Department of Researches Physique, at Paris and had discussions with Prof. A. Zarembowitch in area of applied ultrasonics. □

* * *

Shri Ramesh Chandra of the National Aeronautical Laboratory, Bangalore, visited the Federal Republic of Germany during September-October 1980 under the CSIR-DAAD Exchange of Scientists Programme. During his visit he had discussions with the scientists and engineers of DFVLR Institutes. He acquainted himself with the activities of the Institute of Structural Mechanics like damage mechanics of composites, hollow fibres and hybrid composites, moisture and temperature effects on mechanical properties of composites, and 3D stress analysis of laminated composites — areas of study in composite materials which are of considerable importance to aerospace industry. He also carried out a specific investigation on *J* integral of cracked structures with carbon-epoxy reinforcement, a work of interest to both NAL and DFVLR.

Shri Ramesh Chandra also visited the Institute of Structural Design and Technology, Sttutgart, whose activities encompass composite materials/structures, ceramics and wind energy. Of particular significance were the institute's investigations on boron-aluminium blades for turbine, design and development of carbon-epoxy fin of alpha jet, and glass-epoxy rotor blade of wind turbine. □

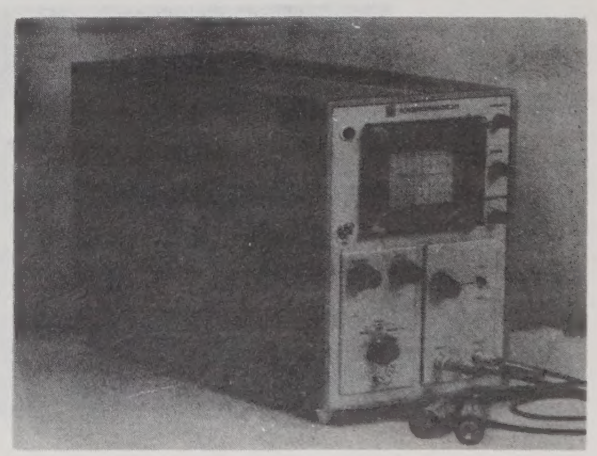
PROCESSES AND PRODUCTS READY FOR COMMERCIAL UTILIZATION

Echoencephaloscope

The Central Scientific Instruments Organisation (CSIO), Chandigarh, has developed an echoencephaloscope, an instrument used to examine the brain. The instrument works on the principle of reflection of ultrasonic pulses by the tissue interfaces of the brain. Ultrasonic pulses are sent into the brain by means of suitable probes. The reflected ultrasonic echoes are picked up, amplified and displayed on a cathode ray oscilloscope relative to the transmitted pulses. The device is used to determine brain tumours, hematomas, etc. and it helps the physician to diagnose structural irregularities easily. Echoencephalograms are easier to obtain using this equipment and can be repeated several times without any harm or discomfort to the subject under test.

The echoencephaloscope developed by CSIO employs a two-probe method and has three modes of operation, viz. single probe mode, through transmission mode and double probe mode. In the last mode, echograms obtained from both sides of the skull are displayed on the scope simultaneously, serving to double the sensitivity of the brain midline detection. Two prototypes have been successfully made and tested by CSIO.

The prototype of the instrument underwent an extensive clinical trial at the Department of Neurosurgery, Postgraduate Institute of Medical Education and Research, Chandigarh, and found to perform very well.



Echoencephaloscope developed by CSIO

The raw materials/components required are ICs, transistors, diodes, capacitors, resistances, transformers, hardware items, CR tubes, transducers, cables, chassis, etc. Oscilloscopes, pulse generators, RF oscillator, multimeter, power supplies, etc. are needed for testing the instrument.

For manufacturing 20 numbers of echoencephaloscopes per annum (excluding land and building) a working capital of Rs 5 lakh is needed.

Terms for transfer of know-how are: lump sum premium, Rs 10,000; recurring royalty, 5%; nature of licence, non-exclusive; and period of licence, 5 years.

Further details of the process (NRDC Process No. 856.03.80) are obtainable from The National Research Development Corporation of India, New Delhi 110024. □

Foam Level Controller

The Central Scientific Instruments Organisation (CSIO), Chandigarh, has developed a foam level controller for use in fermentation processes. The fermentation process requires large amounts of air which result in foaming, and control of foam is necessary to avoid problems of product contamination and nonsterile bath. Foam control is accomplished by the addition of sterile chemical anti-foam agents or by mechanical destruction of foam, or by both. The measuring element is either a capacitance or a conductivity probe. The controller could be of 'on-off' type with built-in time delay to avoid overcharging of the anti-foam agents owing to the slow response of the process.

The foam level controller was developed by CSIO following trials conducted at the Indian Drugs and Pharmaceuticals Ltd, Rishikesh, and has the following salient features: three-tier foam sensing system, time delay between successive charges of anti-foaming liquid, and variable 'on-off' time control. When the foam touches the first level probe, the solenoid opens and admits, for a specified time ('on' time), the anti-foaming oil. Subsequently, 'off' time starts. After the expiry of 'off' time the solenoid operates if the foam is still touching the sensing electrode.

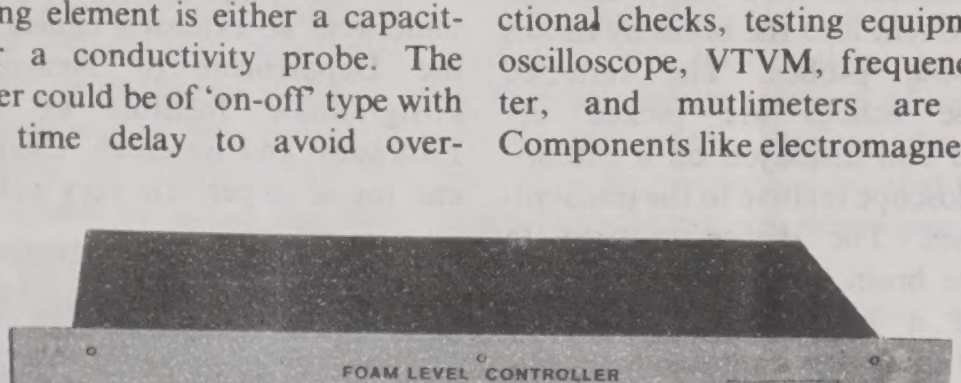
When the foam reaches the second level the equipment's 'on' time is doubled and 'off' time is halved. This increases the quantity of anti-foaming oil flow into the fermentor. In the third level, an alarm is given out, so that manual corrective action can be made. The 'on' and 'off' times can be varied from 0 to 120s in steps of 20s. Indication lamps have been provided for each level. Oil monitoring is done by a mechanical counter which indicates the quantity of oil added.

The manufacture of this equipment is assembly-oriented and hence minor equipment like flypress, bench grinder, hand drills and other hand tools are sufficient for production. For functional checks, testing equipment like oscilloscope, VTVM, frequency counter, and mutlimeters are needed. Components like electromagnetic counters, ICs, transistors, diodes, transformers, capacitors, resistors, switch, chassis, and associated hardware ite are needed. All the components a available indigenously.

For manufacturing 120 units of foa level controllers, a fixed capi (exclusive of land and building) of Rs lakh and a working capital of Rs 0. lakh are needed.

The terms for transfer of know-ho are: lump sum premium, Rs 10,0 recurring royalty, 4%; nature of licen non-exclusive; and period of licence, years.

Further particulars regarding t equipment (NRDC Process N 847.02.80) can be had from: T Managing Director, National Resear Development Corporation of Indi New Delhi 110024.



Foam level controller developed by CSIO

PROGRESS REPORTS

NEERI Annual Report: 1979-80

Geared to play the principal role in th 'Drinking Water Supply and Sanitatio Decade 1981-90' in the country, th National Environmental Engineerin Research Institute (NEERI), Nagpu was endeavouring to ensure communit participation in the relevant pro grammes, according to its annual repor for 1979-80 published recently. As par of the WHO International Referenc Centre sponsored programme, four full scale slow sand filtration plant commissioned in four villages — Abul Shahr (Haryana), Kamaya goundanpatti (Tamil Nadu) Burujwada (Maharashtra) and Pothunuru (Andhra Pradesh), the las three commissioned during the perio under review — are being evaluate under different field conditions and fo rural water supply schemes. A full-scal defluoridation plant (2270 m^3/day) a Kadiri (Andhra Pradesh) based o NEERI design was under construction

The laboratory continued its work o air quality monitoring on a country wide scale with a view to getting a overall picture of base line air quality

Indo-US collaborative project
tled 'Impact of fugitive and stack
ssions from selected industries on
ghbourhood air quality' was started.
ke ovens, steel mills, refineries and
rmal power stations will be covered
ler this project.

The Solids Wastes Group rendered
nnical advice to various municipa-
es on installation of compost plants.
ner aspects of solid waste manage-
nt being studied are anaerobic
estion of refuse, pyrolysis, and
gradation of predominant cellulosic
tter in refuse. A multi-chamber heat
lization type of incinerator of
pacity 110 kg/hr of waste material was
signed and its performance at
ferent loading rates was studied.

A flow-sheet for the design of a waste
atment plant was provided to the
ndustan Organic Chemicals Ltd,
sayani. For treating the wastewater
om FACT's fertilizer factory at
chin, NEERI's zonal laboratory
ochin) suggested a two-stage lime
eatment for 99% and 95% removal of
orides and phosphates respectively.
an investigation aimed at increasing
e production of biogas from cow
ng, it has been found that addition of
ea to decrease C:N ratio yielded 9%
re gas; addition of cobalt chloride
d water hyacinth to cow dung during
gestion yielded 20-33% additional gas;
d a mixture of night-soil and cow
ng resulted in 14% additional gas.
ork was in progress on sewage
lization for cultivation of *Citrus*
riculata, and on algal harvesting from
ste stabilization ponds.

The institute is paying considerable
ention to assessing the impact of
velopmental projects on
vironment.

In view of the water sources at pilgrim
ntres getting polluted, control and
atement measures are called for, and
e institute is paying attention to such
oblems. Based on a study made at
ivari Pushkarini, Tirumala, Tirupati,
e institute has suggested long-term
easures, one of which is a complete
ter treatment plant involving aeration, prechlorination, roughening rock filters and lime and alum addition followed by flocculation and disinfection. Interim measures to abate environmental pollution have also been suggested.

A scheme for augmenting water supply to Ahmedabad from Sabarmati River was studied, and design criteria and process flow-sheet have been evolved on the basis of pilot plant studies.

Twenty-seven consultancy assignments relating to environmental engineering were completed during the period under report; 22 such projects were under way.

The institute brought out 41 special reports on its R&D projects, sponsored research and consultancy assignments. The institute organized a workshop, in collaboration with WHO and the Central Public Health & Environmental Engineering Organisation of the Ministry of Works & Housing, on R&D needs in water supply and sanitation decade 1981-90, and brought out a report identifying R&D topics in water and sanitation as well as manpower development and information systems.

The budget of the laboratory for 1979-80 was Rs 95.930 lakh; revenues from sponsored projects amounted to Rs 46.541 lakh, and from consultancy assignments, to Rs 1.88 lakh. □

Special Issue of Journal of Scientific and Industrial Research

The December 1980 issue of the *Journal of Scientific and Industrial Research* [Vol. 39, No. 12] appears as a special issue commemorating the Golden Jubilee of the Society of Biological Chemists (India) celebrated at the Indian Institute of Science, Bangalore, during 14-18 December 1980. The special issue was released during the morning session on 16 December by Prof. Kunio Yagi of the Institute of Biochemistry, Faculty of Medicine, University of Nagoya, Nagoya (Japan), who has also contributed an article (Toxicity of lipid peroxides in processed foods) in this issue.

The Society has been closely associated with the Publications and Information Directorate for almost three decades in respect of its publication activities in the field of biochemistry, specifically in the running of *Indian Journal of Biochemistry and Biophysics*. Its association with *Journal of Scientific and Industrial Research* dates back to the mid-fifties. The review articles in the field of biochemistry published in this journal are sponsored and processed by the Society.

The special issue carries 24 review articles. The first article by Dr C.R. Krishna Murti and Prof. N. Appaji Rao, President and Vice President respectively of the Society for 1979 and 1980, surveys the activities of the Society during 50 years of its existence. The second article by Prof. H.R. Cama traces the growth and genesis of biochemistry in India. The remaining 22 articles are critical reviews in some of the important areas of current research interest in biochemistry contributed by biochemists of international standing from India (6), Japan (5), UK (5), USA (2), Italy (2), Germany (1) and France (1). The special issue is priced at Rs 20.

PERSONNEL NEWS

Shri G. Chatterjee

Shri G. Chatterjee, Indian Railway Accounts Service, has been appointed Chief (Administration), Council of Scientific and Industrial Research, with effect from 26 December 1980.

Shri K.C. Sundarachari, who relinquished the office of Chief (Administration), CSIR, on 26 December 1980, has been appointed Officer on Special Duty in the office of the Director General, Scientific and Industrial Research (26 Dec. 1980); this newly created post will be held by Shri Sundarachari till 31 March 1981.

* * *

Shri V.M. Joshi, Section Officer (A&A), National Institute of

Oceanography, Goa, has joined on promotion, as Finance & Accounts Officer, Central Salt & Marine Chemicals Research Institute, Bhavnagar (24 Nov. 1980).

CONFERENCE ANNOUNCEMENTS

International Symposium on Time and Frequency

The National Physical Laboratory (NPL), New Delhi, will be organizing an international symposium on Time and Frequency during 10-12 February 1981, in cooperation with Bureau International de l'Heure (BIH) and International Radio Consultative Committee (CCIR) and under the co-sponsorship of a number of other organizations.

The symposium will cover: (1) Dialogue between developing and developed centres of time and frequency; (2) Time needs of areas not covered by general global time dissemination services and the means to satisfy these; (3) Development and production of low-cost, high-performance time standards and clock networks; (4) Clock reliability in view of adverse environments and no ready service availability; (5) Regional time and frequency distribution and calibration requring low sophistication/training; (6) Relationship of developing and remote time centres with BIH and CCIR; (7) A global time dissemination/synchronization to a nanosecond precision; (8) Satellite/laser ranging time transfer with potential as global time transfer techniques to nanosecond precision; (9) Steering and coordination of time scales; and (10) Other areas of relevance, including applications.

Further details regarding the symposium may be had from: Dr B.S. Mathur, Scientist in charge, Time and Frequency Section, National Physical Laboratory, Hillside Road, New Delhi 110012. □

NOMINATIONS INVITED

Shanti Swarup Bhatnagar Prize for Science and Technology for the Year 1981

Nominations are invited for the award of Shanti Swarup Bhatnagar Prizes for 198
The Shanti Swarup Bhatnagar Prize is the highest and most coveted award made
Indian scientists and technologists working in India. Instituted in 1957 by t
Council of Scientific & Industrial Research in memory of its first Director a
architect late Dr Shanti Swarup Bhatnagar, the award is made each year f
outstanding contributions in science, including engineering and technology, and
for research contributions made primarily in India during the five years precedi
the year of the prize. The upper age limit for nominees for the prize is 45 years

Five or more prizes, each of value of Rs 20,000, may be awarded annually f
notable and oustanding research, applied or fundamental, in the followi
disciplines:

(1) Physical Sciences; (2) Chemical Sciences; (3) Biological Science
(4) Engineering Sciences; (5) Medical Sciences; (6) Mathematical Sciences; a
(7) Other Sciences.

To decide the prizes, the Council invites and accepts nominations each year fro
the presidents of approved scientific societies of all-India character, vice chancello
of universities, deans of science, engineering and technology, and medical faculti
directors of Indian Institutes of Technologies (IITs), deans of faculties and heads
institutions deemed to be of university status, director generals of major R&
organizations, such as Defence Research & Development Organisation, India
Council of Agricultural Research, Indian Council of Medical Research, chairmen
Atomic Energy Commission, Space Commission, University Grants Commissio
Oil & Natural Gas Commission, etc., directors of CSIR laboratories and Bhabh
Atomic Research Centre, Tata Institute of Fundamental Research, etc. and th
Bhatnagar Prize winners. University faculties may recommend persons working i
their institutions only and route the nominations through their respective vic
chancellors while the faculties in IITs may send their nominations through the
directors. The directors of CSIR laboratories may nominate a candidate in th
discipline of their interest, irrespective of whether they are working in CSI
laboratories or outside. Each Bhatnagar Prize awardee may send nomination of on
person for each year's award in his own discipline only. Each such nominatio
should give a detailed statement of work and attainments of the nominee, and
critical assessment report (in not more than 500 words) bringing out the importanc
and significance of research and development contributions of the nominee mad
during five years preceding the year of the prize. Nominations from individual
sponsoring their own names or of others are not accepted.

Nominations may be sent by registered (acknowledgement due) post along wit
15 copies of detailed statements of work and attainments of each nominee and th
discipline in which the nominee is to be considered. The attainments of the nomine
during the past 5 years may be highlighted, and sent along with at least one set o
reprints of papers published during the 5-year period. Nominations signed by th
sponsors should be sent, marked 'confidential', to the Head, Extramural Research
CSIR, Rafi Marg, New Delhi 110001, so as to reach him latest by 31 March 1981

The regulations governing the prize and the proforma for nomination may b
obtained from the Head, Extramural Research, CSIR, Rafi Marg, New Delh
110001.

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C.F.T.R.I., MYSORE

OIL TECHNOLOGICAL RESEARCH INSTITUTE A RESUME

The Oil Technological Research Institute (OTRI), Anantapur, was established on 26 August 1949 by the then undivided Madras Province as a part of the postwar development schemes "to tackle the problems of oil and allied industries in the region". The only one of its kind in the country solely devoted to oil technology, OTRI is designed on modern lines of similar institutions and equipped with all facilities—laboratory, pilot plant, library, services, etc.

The institute is a pioneer in the technology of major oilseeds like cottonseed and groundnut. It has also paid equal attention to minor oilseeds like safflower, niger, tobacco and *ambadi* seeds and improved their processing techniques. If today 30 extraction plants in Andhra Pradesh alone are regularly extracting oil from rice bran, it is because of the technological awareness and know-how created by OTRI. Processing and utilization aspects of waste products like silkworm pupae, coffee residues, water-melon seed and musk-melon seed have been worked out to the extent of making all of these waste materials into much coveted raw materials for oil industry. Processes have been developed to recover industrial-grade lecithin from indigenous vegetable oils and oil sludge—a waste product of solvent extraction industry. This work has received the National Research Development Corporation of India's award for import substitution. The institute was the first to spotlight the importance of utilizing mango stones. One million tonnes of mango stones from which 30,000 tonnes of fat, a substitute for imported cacao butter, are available every year in the country. Techniques for drying and decortication of mango stones, preconditioning and extraction of mango kernel, refining of mango fat to edible grade and utilization of the extracted meal; are some of the achievements which have won wide appreciation. Methods using indigenous equipment for decuticling groundnut kernels and sesame seed have been patented. Abattoir wastes like fat tissues and meat meal have been studied to recover solid fats useful in textile sizing and soapmaking. A simple press has been fabricated to recover ghee from residues available from modern ghee-making industry. Three types of decorticators have been developed and worked successfully for decortication of sal fruit; one of them is for use in a mill, another is a hand-operated unit to work in the interior of forests, and the third is a power-operated mini unit. Colour tests for detection of *pongam* and *neem* oils have been developed and these have been adopted by the Indian Standards Institution for quality-control purposes. A new colour test for sesame oil, called 'OTRI test', has been developed which adds up to the list of several colour reactions of sesame oil.

The Council of Scientific & Industrial Research has decided to take over the Oil Technological Research Institute (OTRI), Anantapur. [*CN*, **30** (1980), 177].

Current Programmes

In recent years the institute has focussed attention on the post-harvest problems of oilseed crops. Two schemes, one on post-harvest technology of major oilseeds and another on post-harvest technology of minor oilseeds, have been taken up under the aegis of the Indian Council of Agricultural Research. Methods of drying freshly harvested groundnut at mill level as well as at field level have been devised. Optimum methods to crush high-moisture groundnut have been studied to bypass predrying step. A cheap field kit to determine the moisture content in groundnut pods has been devised and found to be effective under actual field conditions.

A single-step technique for decortication as well as decuticling of groundnut has been developed. Machinery to dehull sunflower seed and optimum conditions for processing sunflower kernels for oil are being studied. A simple salt solution dip method has been developed to prevent spoilage of coconut kernels. Stabilization of maize germs and refining of oil are being studied as maize germ oil possesses a great potential as an edible oil, especially for use by heart patients.

Among minor and non-edible oilseeds, tung seed, oil palm, *Cleome*

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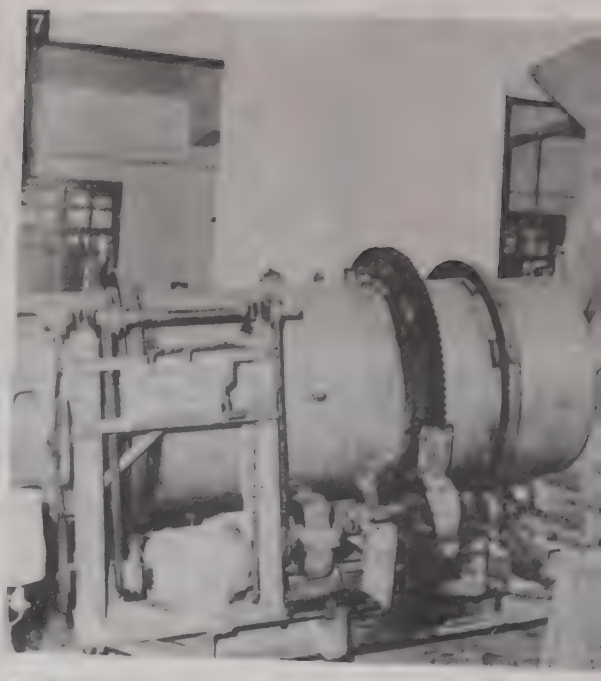
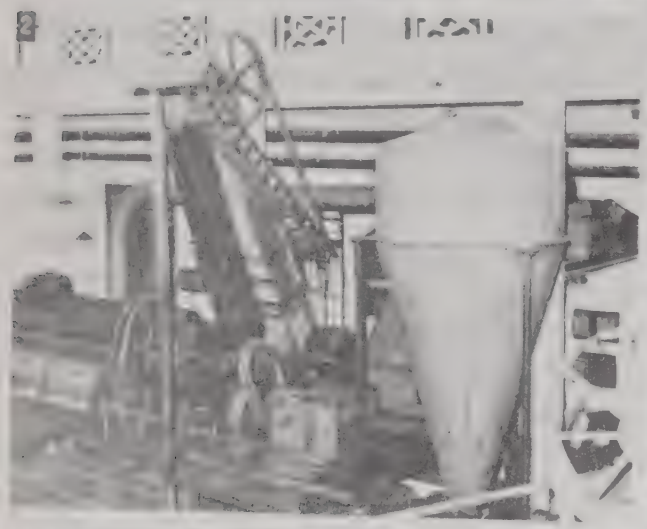
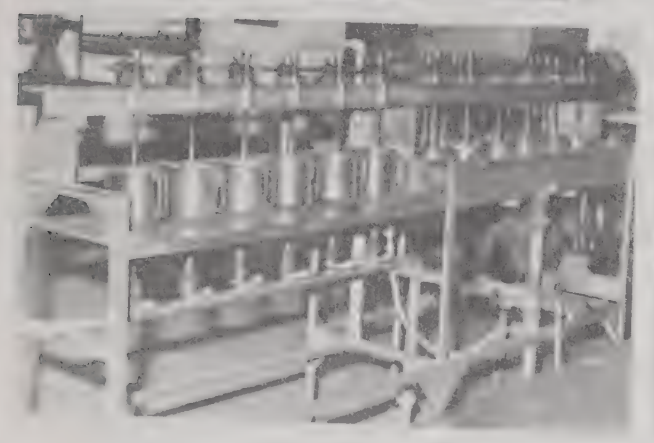






EQUIPMENT/FACILITIES AT OTRI

1. Solvent extraction plant; 2. Pilot plant section; 3. AOCS refining and bleaching unit; 4 Molecular distillation unit; 5. Mango stone decorticator; 6. Solar dryer; 7. Rotary dryer; 8. Mini sal seed decorticator; 9. Twitchell fat splitting unit

scosa, teak seed, tapioca (cassava), ger seed, kapok seed and rubber seed e being investigated. Problems of ollution in oil-based industries and arnessing of solar energy for drying ilseeds are also receiving attention. rocesses to recover essential oils and atty oils from umbelliferous seeds *ajowan*, coriander, dill, etc.) are being eveloped. The institute's work has hown for the first time that deodar seed ontains an essential oil resembling edar wood oil, and a fatty oil which is a emi-drying oil. Methods suitable for mall-scale and cottage industries for ecovering the essential oils from *davana* and *maruvam*, highly valued for their fragrance and grown widely in South India, are being developed.

The institute has published 350 research papers and taken out 11 patents, and helped ISI in the formulation of 50 standards. It has to its credit five gold medals from the Oil Technologists Association of India (OTAI) and won the Prag Narain Memorial Award thrice successively from OTAI. □

Energy from the Sea: Workshop at NIO

A two-day national workshop on Energy from the Sea held at the National Institute of Oceanography (NIO), Dona Paula, Goa, on 15-16 December 1980 facilitated exchange of recent research findings between scientists, engineers and planners and identification of areas of future R & D programmes in the country. Seventy-five delegates participated and 37 papers were presented.

Shri Pratap Singh Rane, Chief Minister of Goa, Daman and Diu, who inaugurated the workshop, stressed in his address, the need for finding alternative sources of energy. He commended the work being done by NIO in extracting energy from the sea. Shri Froliano Machado, Speaker of Goa Assembly, in his address as chief guest emphasized the need for giving the highest priority to research and development programmes on energy from the sea.

The deliberations of the workshop were held in five technical sessions: Ocean thermal energy conversion (OTEC), Wave energy, Tidal energy, Energy from salinity gradient, and Marine biomass conversion.

Recognizing that India offers high potential for installation of OTEC plants, espacially at Lakshadweep, the workshop recommended that a consortium of experts be constituted to go into all aspects of the development of an experimental OTEC plant of 1MW capacity. Through another recommendation, the workshop suggested that the wave-activated generator developed by Madras Port Trust should be utilized for charging navigational light buoy batteries at all ports and harbours in the country. Urging that wave data collection for extraction of wave energy should be intensified, it recommended that for locating tidal power plants, promising sites like the Gulf of Kutch, Gulf of Cambay and Sunderbans be studied in depth.

The workshop also recommended the taking up of time-bound programmes under a well-coordinated systems approach. Detailed R & D work should be initiated to study energy extraction from salinity gradient and marine biomass conversion. □

Improvements in Aluminium Utensils Manufacture

The National Metallurgical Laboratory (NML), Jamshedpur, had, under a project sponsored by the Bihar government, worked out improved processing technology of manufacture of aluminium utensils. The aluminium utensils manufacturing industry in the state, whose turnover is about Rs 8 crore, was earlier confronted with the problem of high rejection (30-35%) rates, especially in double operation vessels. A team of NML scientists, led by Dr Rajendra Kumar, investigated the problem and brought down the rejection rate to 6%; the rejection rate in the case of utensils made out of INDAL/BALCO/HINDALCO sheets came down to as low as 2%. The rate could be further lowered by implementing the recommendations of NML.

With a view to implementing the recommendations of NML, a workshop on 'Improvements in Aluminium Utensils Manufacture' was held on 1 November 1980 at Patna. The workshop, jointly organized by Industries Department of the Bihar government, CSIR Polytechnology Transfer Centre (Patna), Bihar State Aluminium Rerollers & Manufacturers Association, and NML, revealed that actual implementation of the recommendations of NML in commercial practice would substantially enhance the productivity of utensil manufacturers as already established during the in-plant trials conducted at one of the leading utensil manufacturers. The President of the Bihar State Aluminium Rerollers & Manufacturers Association, in a memorandum, has indicated the benefit which the small-scale industries would get by implementing NML's recommendations. The laboratory, on its part, has offered its assistance to individual units in the implementation of its research results. □

NML Evaluates Bolani Iron Ores for Modernizing Durgapur Steel Plant

The Steel Authority of India (SAIL) is taking up, in collaboration with the British Steel Corporation (Overseas Services), a project on the modernization of its Durgapur Steel Plant (DSP). In this connection, a team of engineers from the British firm accompanied by the engineers of DSP and SAIL (R & D) studied the facilities available in India for studying the washing characteristics of Bolani run-of-mine ore sample. The team recommended that the beneficiation studies be entrusted to the National Metallurgical Laboratory (NML), Jamshedpur. Accordingly, over 100 tonnes of a run-

of-mine ore sample from Bolani Ores Ltd were received by NML and detailed pilot plant washing studies on the sample were carried out. The members of the British team were also present during a part of the investigations. Flowsheets were developed for washing the iron ore sample with different water ratios using spiral and rake classifiers. A detailed report has since been furnished to the Durgapur Steel Plant, the sponsor. □

Maintenance of Pregnancy during Protein Deficiency

Complete removal of dietary protein leads to failure of pregnancy, which can be overcome by adequate administration of estrone and progesterone. Protein malnutrition results in uterine decline in nuclear population of estrone and progesterone receptors (ER and PR) and a higher magnitude of translocated receptors in nuclei than in controls. Scatchard analysis reveals that protein malnutrition affects the binding properties of receptor molecules. In steroid-maintained pregnancy, a high ER level on day 15 suggests continuous replenishment followed by a decreased ER at the end of pregnancy. But the concentration of PR is much higher in day 20 of pregnancy, which may suggest prevention of premature onset of pregnancy. Shri Raj Kumar Singh of the Division of Endocrinology of the Central Drug Research Institute, Lucknow, has carried out chemical and biochemical studies on the maintenance of pregnancy during protein deficiency.

Transcriptional studies with RNA polymerases and *in vivo* incorporation of ^{3}H-uridine demonstrated a preferential stimulation of nucleoplasmic RNA synthesis during steroid-maintained pregnancy. Protein malnutrition had also a hypocholesterolemic effect on ovaries, which could be corrected by hormone replacement therapy. Thus pregnancy failure in protein deficiency was related chiefly to decreased uterotropic activity. But the correction of this state by steroid hormone was intriguing in the light of pituitary gonadotropins. An index could thus be extrapolated for nutrition-endocrine relationship in higher animals during nutritional insult.

Shri Singh, who carried out the studies under the guidance of Dr S.K. Roy of the division, was awarded Ph. D. degree of the Kanpur University for his thesis based on the studies. □

Interferon from Plants

Smt. Anita Rani Madan of the Division of Virology of the Central Drug Research Institute, Lucknow, has studied the possibilities of interferon production from plants. Of the 352 plant extracts screened in chorionic allantoic memberane (CAM) culture system against Ranikhet disease virus (RDV) and vaccinia virus (VV), 56 (15.86%) possessed a varying degree of interferon-like activity; 11.89% were active against RDV and 6.51% against VV; and 2.27% had the ability to inhibit both. The occurrence of antiviral activity in the plant extracts prepared in the different seasons of the year showed that this property was highest in the coldest season and lowest in the hotest season.

Cassia fistula was found to possess a high concentration of interferon-like activity against both the viruses. Extracts of *C. angustifolia* and *C. tora* inhibited the multiplication of RDV only. In *C. fistula* the antiviral activity was localized to the stem bark and the pod of the plant.

As RDV (an avian virus) is known to induce the synthesis of interferon in several animals, like fowl, rat, and mice, callus cultures of *C. fistula* were treated with RDV at their exponential phase of growth. It was found that RDV could interact with the metabolism of plant cells under controlled conditions of tissue culture and induce synthesis of virus or interferon-like proteins.

Interferon-like antiviral factor(s) isolated from callus infected with RDV resembled a similar factor isolated from plants. It was found to be heat-stable, more resistant to trypsin treatment and devoid of any host specificity. Between chick interferon and plant interferon, the latter had bett protective value and higher therapeut index. Interferon property inductio once stimulated in plant cells could b carried up to the second subculture.

All attempts to induce organogenesi in the callus tissue of *C. fistula* prove unsuccessful. Only in one set o experiment, in two cultures out of 24 replicates roots differentiation occurre to a limited degree, which could not b repeated even after extensive trials.

Smt. Madan was awarded Ph. D degree of the Kanpur University for he thesis based on the studies. She worke under the guidance of Dr O.P. Babbar o the division. □

SERC s Ferrocement Water Tanks Find Large Scale Use

Ferrocement water tanks developed by the Structural Engineering Research Centre (SERC), Madras, have proved to be a better and more competitive substitute to conventional water tanks generally made of RC base slabs and brick walls or pressed steel tanks.

Several hundreds of ferrocement water tanks have been constructed by various construction agencies on the basis of SERC's design data. The agencies include: Tamil Nadu Housing Board, Tamil Nadu Slum Clearance Board, Tamil Nadu Public Works Department, Directorate of Technical Education, Tamil Nadu, Military Engineers Services (South Zone), and Posts & Telegraphs Department (Madras Zone).

The Tamil Nadu Housing Board have reported that so far they have cast 12,000 water tanks of 800 litres capacity each for residential flats and have effected a saving of Rs 10.56 lakh. The Tamil Nadu Slum Clearance Board have built 4450 tanks of 500 litres capacity each. MES have put up 454 tanks of 800 litres capacity each at three places, viz. Madras, Bangalore, and Secunderabad. Reports received from these agencies indicate that ferrocement water tanks are cheaper by about 25% compared to the conventional brick-walled cement concrete tanks.

The problem of frequent painting to void rusting of the steel tanks, or the roblem of leakage in tanks of RC slab nd brick walls construction, is not ncountered in the ferrocement tanks. esides, these tanks are lighter, and ence transfer less load on the upporting structure below. They can e easily fabricated at any work site by sing locally available unskilled labour.

A booklet containing the design and abrication techniques relating to ylindrical, square and rectangular water tanks of up to 10,000 litres capacity has also been brought out by he laboratory. □

Conference Briefs

Information Training for Developing Countries

Shri T.N. Rajan of the Indian National Scientific Documentation Centre, New Delhi, participated in an international conference on Information Training for Developing Countries held in Berlin (West) during 15-20 December 1980. The conference was organized by the German Foundation for International Development (GFID) and was jointly sponsored by Unesco, the British Library and FID/Education and Training Committee. The delegates were drawn from Africa, Latin America, Asia, Great Britain, USA and West Germany; representatives from FAO (AGRIS), FID/ET and Unesco also participated. Shri Rajan reports that the conference considered the existing quality of teaching and learning material (TLM) in the less developed countries and recommended steps to aid these countries to develop expertise in producing TLM to suit national and regional needs, particularly in the area of technological applications. Shri Rajan presented two papers: (i) Teaching and learning material —an Indian overview; and (ii) A teaching manual for subject indexing.

As a member of FID/ET, Shri Rajan also participated in a joint meeting of FID/ET, IFLA and ICA, held at Frankfurt on 12-13 December 1980 to consider joint programmes of the three non-governmental organizations in education and training in library and information science. A sub-committee has been formed to draw specfic programmes and activities.

Shri Rajan visited a few schools of library and information science in England, on his way to Berlin, from 1 to 12 December 1980. He also visited the various divisions of the British Library, including the Lending Division at Boston. The tour was under invitations from GFID and the British Council. □

Deputation Briefs

Dr A.S. Rao of the National Chemical Laboratory (NCL), Pune, visited Egypt from 30 September to 12 October 1980 under the Indo-ARE agreement for scientific and technical cooperation. In Egypt he had discussions with Prof. M.M. Sidky of the National Research Centre at Cairo. Prof. Sidky, who himself has done pioneering work relating to the development of a number of pesticides, showed keen interest in the work being carried out in NCL. Prof. Sidky and Dr Rao discussed the possibility of taking up collaborative projects by NRC and NCL. NRC's President, Prof. Mohamed Kamel, whom Dr Rao met, was also interested in taking up projects common to NCL and NRC.

Dr Rao also visited the various laboratories of NRC including its pilot plant facilities of the Chemical Engineering Department. □

PROGRESS REPORTS

CIMAP Annual Report: 1979-80

Improvement of agronomic practices and development of new varieties of major medicinal and essential oil plants were the two aspects of work on which the Central Institute of Medicinal and Aromatic Plants (CIMAP), Lucknow, laid emphasis during the year, according to its annual report for 1979-80 published recently. The institute investigated 67 projects in all; 11 projects were completed and 15 new projects were taken up.

In the area of genetics and plant breeding, a new mutant of *Mentha piperita*, a source of peppermint oil, selected last year was tested under different fertility conditions at Lucknow, Pantnagar and Jammu and found to give better herb yields under all fertility conditions at all locations. The mutant was expected to be released early in 1981 for commercial cultivation in the subtropical north Indian plains.

Studies on the improvements of medicinal plants through tissue culture were continued in collaboration with the National Botanical Research Institute, Lucknow. It has been established that yields of rhizomes of *Dioscorea floribunda* from tissue culture raised plants are comparable to those obtained in rhizome propagated crops. A few promising clones of *D. floribunda* containing 5% diosgenin were being multiplied with a view to releasing the best variety for commercial cultivation.

Evaluation trials on seven superior strains of Japanese mint selected earlier on the basis of green herb, oil content and menthol content have shown that two strains (J-655 and L-68) are most promising.

The response of palmarosa (*Cymbopogon martini* var. *motia*) to nitrogen, phosphorus, potassium and zinc has been studied in view of the fact that palmarosa oil is a foreign exchange earner. The crop responded only to nitrogen and phosphorus; potassium and zinc did not influence the herb and oil yields. Highest yields were obtained with the application of 150 kg N and 50 kg P_2O_3 per ha, without potassium and zinc, in the soils of Uttar Pradesh. These findings would be very valuable to cultivators in improving the oil yields of palmarosa.

First experiments on optimum spacing and nitrogen requirements of opium poppy in Lucknow region were carried out with a view to helping farmers in the adjoining Barabanki area, a major opium growing area in the country. Optimum spacing and nitrogen require-

ments of citronella Java for north Indian plains were worked out. A fertilizer schedule for citronella in tarai area was also developed. Fertilizer requirements for *D. floribunda* in north Indian plains, and for geranium in Bangalore were under study.

An ergocristine strain of ergot (*Claviceps purpurea*) isolated from a wild grass was adopted to rye. This is the first time that a wild strain of *C. purpurea* has been adopted to rye.

The process for the isolation of total alkaloids from the leaves of *Hyoscyamus muticus*, a rich source of hyoscyamus alkaloids introduced in the farms last year, was scaled up to 70 kg level. The major alkaloids—hyoscyamine and hyoscine—were separated, and hyoscyamine was racemized into atropine. The process can be utilized depending upon the demand for hyoscyamine or atropine.

The analysis of the leaves of *Duboisia myoporoides*, a tree indigenous to Australia and introduced by CIMAP at Lucknow, shows the alkaloid content varying from 1.56 to 3.44% (*c.* 60% hyoscine and 30% hyoscyamine) with an average 2.24%. The plant introduced at Bangalore was disease- and insect-free and the leaves contained a higher percentage of total alkaloids (2.94-4.98% with an average of 3.4%). The cultivation trials have established that *D. myoporoides* can be cultivated as a commercial crop both in the northern plains and in the southern regions.

The introduction of the crop is expected to result in the establishment of an alkaloidal industry based on tropane alkaloids both for internal consumption and for export. Till now the only sources of hyoscine in India were the seeds of *Datura innoxia* and leaves of *Datura metel*, both of which are not suitable for commercial exploitation.

The institute has developed a laboratory-scale process for isolating total alkaloids from the leaves of *Catharanthus roseus* in 0.86% yield.

The institute launched three rural development projects one each in Uttar Pradesh, Jammu & Kashmir, and Karnataka. The aim of the projects is to help farmers in the cultivation of medicinal and aromatic plants like Japanese mint, citronella Java, pyrethrum, ergot, geranium and patchouli. Assistance was also rendered to farmers on the distillation of herbs for producing essential oils.

The institute supplied to interested parties agrotechnologies for medicinal and aromatic plants as a result of which the foreign exchange savings are estimated at Rs 850 lakh. Also, the institute produced medicinal plants and essential oils worth Rs 3.781 lakh from R&D trials. Goods worth Rs 47.14 lakh were produced in the J&K commercial unit, the profits amounting to Rs 8.635 lakh vs Rs 2.35 lakh in 1978-79.

The budget of the laboratory for 1979-80 was Rs 88.536 lakh comprising a recurring expenditure of Rs 39.539 lakh and a capital expenditure of Rs 48.997 lakh. □

NBRI Publications

The National Botanical Research Institute (NBRI), Lucknow, has brought out two new publications, viz. Bibliography on Algicides, and Extraction of Jasmine Flower Oil (Extension Bull. No. 7). The former contains 247 references related to algicides. The publication on jasmine oil contains information on the applications of the oil and the raw materials and equipment required for its production; it also includes information on economics of production and market potential for jasmine concrete.

The publications (priced) can be obtained from: The Director, National Botanical Research Institute, Lucknow 226001. □

Toxicology Data Sheets on Chemicals

The Industrial Toxicology Research Centre (ITRC), Lucknow, as a national correspondent of International Register of Potentially Toxic Chemicals (UN Environment Programme), has taken up the task of collection and dissemination of data on chemicals used in significant quantities in industry and agriculture in India. Under the programme ITRC is compiling 'Toxicology Data Sheets' on these chemicals; the first two of the series on DDT and Parathion-Methyl have already been compiled. Besides the chemical characteristics the data sheets (mimeographed) contain a brief account of the toxicological effects. References to the literature pertaining to the toxic effects of these chemicals are also included.

The data sheets are obtainable from The Director, Industrial Toxicology Research Centre, Lucknow 226001. □

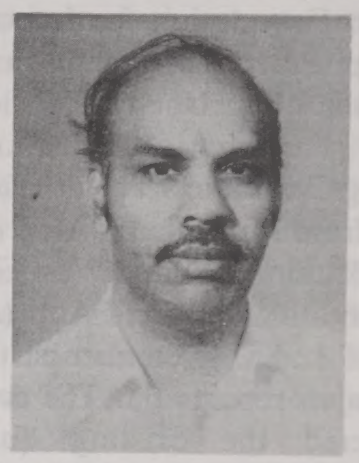
PERSONNEL NEWS

Appointments/Promotions

Dr A.V. Rama Rao

Dr A.V. Rama Rao of the National Chemical Laboratory (NCL), Pune, has been promoted as Scientist F (3 Nov. 1980); he assumed charge as head of the Organic Chemistry (Natural Products) Division from 26 November 1980.

Dr Rama Rao (born 2 April 1935) obtained his B.Sc. degree (1956) from



the Andhra University and B.Sc. (Tech.) (1960) in the technology of pharmaceuticals and fine chemicals from the Bombay University. Joining NCL in August 1960 as a research fellow, he worked under the guidance of Prof. K. Venkataraman and obtained his Ph.D. (Tech.) degree in 1964.

Appointed, at NCL, as Scientist B in 1965, he became a project leader in 1966. His research contributions relate to such diverse fields as plant phenolics, insect pigments, applications of NMR spectroscopy and mass spectrometry for structural elucidation of natural pro-

cts, new reagents in organic synthesis, nthetic drugs and synthesis of ological ly active compounds.

In 1973 Dr Rama Rao was deputed to ork with Prof. D.H.R. Barton, N.L., the Imperial College of Science and echnology, England, during which eriod he visited several universities and harmaceutical industries in and round England and gave a series of ectures. In 1975 he was offered a ostdoctoral assignment for two years y Prof. E.J. Corey, Harvard niversity, Cambridge, USA, and vorked on the total synthesis of nacrolides.

On his return to India, he has led a mall but effective group, and has made ignificant contributions in both basic nd applied projects. His present nterests include the total synthesis of adriamycin, an antitumour antibiotic; solation of dimeric *Vinca* alkaloids; and he synthesis of macrolides.

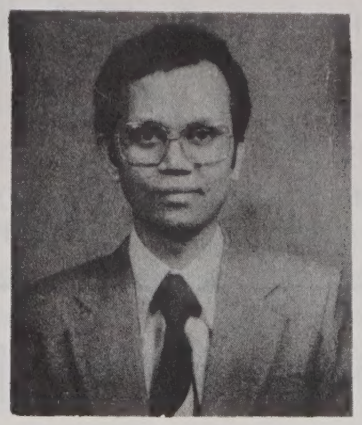
He has also contributed significantly o industrial research. A four-step process for the manufacture of Diazepam, an anti-anxiety agent, was developed and released to three parties for exploitation. As an institutional consultant, he has helped a local small-scale industry to develop outlets for the byproduct *p*-toluenesulfamine in the manufacture of saccharin. He has provided technical consultancy to a pharmaceutical industry in Bombay in the planning and production of several bulk drugs, resulting in considerable savings in foreign exchange.

Dr Rama Rao has published 85 research papers. He is a recognized guide for Ph.D. degree of Bombay, Poona and Shivaji universities and so far five students have obtained their Ph.D. degrees under his guidance. □

Dr R.A. Mashelkar

Dr R.A. Mashelkar of the National Chemical Laboratory (NCL), Pune, has been promoted as Scientist F (3 Nov. 1980).

Dr Mashelkar (born 1 Jan. 1943) obtained his B. Chem. Engg. (1966) and Ph.D. (1969) degrees from the University of Bombay. Joining the Department of Chemical Engineering of the University of Salford, UK, as a Leverhume research fellow, he became, in 1970, lecturer in chemical engineering



at Salford, a position he held until the end of 1976. He was a Visiting Professor at the Department of Chemical Engineering, University of Delaware, USA, during 1975-76. In November 1976 he joined NCL as Scientist E. Since October 1978 he has been heading NCL's Chemical Engineering Division.

Dr Mashelkar's research interests encompass polymer science and engineering, transport phenomena in non-Newtonian fluids and mass transfer with/without reaction. He has published over 70 research papers, and his contributions in non-viscometric flows of non-Newtonian fluids, turbulent drag reduction in complex flows and diffusion in macromolecular systems have been widely acclaimed.

Dr Mashelkar is the editor of *Chemical Engineering Communications* (Gordon Breach, USA), associate editor of the international series *Advances in Transport Processes* (Wiley Eastern/John Wiley), member of the International Reviewers' Board of *Applied Mechanics Reviews* (USA), and member of the publications committee of *Indian Chemical Engineer*. A founding fellow of the Society for Polymer Science in India, Dr Mashelkar is also a member of the American and British Societies of Rheology.

Dr Mashelkar has given a number of invited lectures in UK, USA, Canada, Germany, Holland and Italy. Included among these is the prestigious invited lecture he gave in the World Congress on Chemical Engineering (Amsterdam, 1976) and the plenary lecture in the Eighth International Congress on Rheology (Naples, 1980).

Dr Mashelkar played an important role in building up a major research group in applied rheology and non-Newtonian fluid mechanics in the University of Salford. During the last four years he has been responsible for building up a major programme on polymer science and engineering at NCL. An industrial consultant in the field of chemicals and polymers, Dr Mashelkar has been associated in R&D planning in the country in his capacity as member of several national-level committees. □

Dr B.S. Mathur

Dr B.S. Mathur of the National Physical Laboratory (NPL), New Delhi, has been promoted as Scientist EII (30 Oct. 1980) under the merit promotion scheme.

Dr Mathur (born 1 July 1941) did his M.Sc. from Allahabad University (1959), Ph.D. from Harvard University, USA (1966) and postdoctoral work at Columbia University, USA (1966-68). Joining the faculty of Indian Institute of Technology, Kanpur, in August 1968, Dr Mathur moved to NPL in August 1973 as Scientist in charge of the Time and Frequency Section.

Dr Mathur has visited USSR and Switzerland as a member of the Indian delegations, and Australia on invitation to present a paper on time and frequency activities at NPL. He is associated with several national and international committees and working groups.

Dr Mathur was the convener of the national seminar on Time and Frequency held at NPL in November 1976 and study group meeting on Time and Frequency held at NPL in November 1978. He is the convener of the international symposium on Time and Frequency to be held at NPL in February 1981. Dr Mathur has edited two symposia proceedings, and has more than 50 publications to his credit. □

Dr K. Vadalkar

Dr K. Vadalkar of the Regional Research Laboratory (RRL), Jammu, has been promoted, consequent upon assessment, as Scientist E1 (1 June 1978).

Dr Vadalkar (born 15 Aug. 1931) joined the laboratory as Junior Scientific Officer in 1961. Moving, on promotion, to RRL, Jorhat, where he worked till February 1978, he returned to the Jammu laboratory as Scientist C.

A doctorate in microbiology from the Allahabad University, Dr Vadalkar has isolated and developed microbial strains belonging to *Arthrobacter* and *Micrococcus* spp. which can convert plant and animal sterols into key intermediate chemicals like 1,4-androstadiene, 3,17-dione used in the production of steroidal antifertility drugs, anabolics and sex hormones. The laboratory-scale work is being developed further for its commercial application.

Dr Vadalkar had been to France in 1969 to work for a year at the French Institute of Petroleum on production of single cell protein from hydrocarbons. In 1975 he was elected Fellow of Royal Institute of Chemistry. With 25 research papers and five patents to his credit Dr Vadalkar is a recognized guide for Ph.D. of the Gauhati and Dibrugarh universities. □

* * *

Shri K.S. Nagarajan, Officer in charge of the Bangalore Regional Centre of the Indian National Scientific Documentation Centre, has been given additional charge of the Polytechnology Transfer Centre, Bangalore (4 Dec. 1980). He has relieved Dr V. Krishnan, who has been posted back to the Central Electrochemical Research Institute, Karaikudi.

Honours and Awards

NML Scientists Awarded Sir Ganga Ram Memorial Gold Medal

Shri A.K. Saha, Shri M.J. Shahani and Prof. V.A. Altekar of the National Metallurgical Laboratory (NML), Jamshedpur, have been awarded Sir Ganga Ram Memorial Gold Medal for 1979-80 by the Institution of Engineers (India) for their pioneering work on the extraction of nickel from solution by adsorption on lignite. Their work was published under the title 'Multi-stage adsorption of nickel by lignite and related studies' in *Journal of Institution of Engineers* (Feb. 1980). By using standardized solutions of ammoni nickel carbonate, 100% of the ni could be extracted by adsorption crushed lignite of Neyveli ori Metallic nickel could be recovered fr the loaded lignite directly by ignitio an induction furnace. Alternativ nickel could be elutriated as its sulph followed by electrowinning to obt high-purity nickel metal.

COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARC

Advertisement No. 2/81

It is proposed to fill two posts of Scientist F (Deputy Director) at the Central Leather Resear Institute, Madras. These are senior R&D management posts and the incumbents are expected to provi high-level leadership in the identification of research tasks, planning and execution of programmes a coordination between different disciplines within the institute and outside agencies, and the leath industry. In addition, they are expected to assist the director in the overall administrative and manageri functions.

Job requirements

For post No. (*i*): The incumbent should have the ability to plan, programme, conduct, correlate, dire and sell research relating to biochemistry, chemistry, biology, technical liaison and information a biophysics of leather and raw hides and skins, interact with research organizations/universities and wi leather industries.

For post No. (*ii*): The incumbent is required to organize research and guide workers in the field leather technology and to provide necessary assistance to industry in the production/development various types of finished leather.

Qualifications

For post No. (*i*): High academic qualification in fields and disciplines relevant to leather scienc technology. Proven record of research in the field as evidenced by research publications/monograph books, etc.

For post No. (*ii*): High academic qualifications followed by proven ability of significant experience the production/development of various types of finished leather in a tannery in all operations evidenced by research publications/monographs/books, etc. Experience in diverse fields connected wi science/technology/trade/commerce of leather is required.

Salary/conditions of service: The salary scale attached to the above posts is Rs 2000-125/2-2500. Initi pay will be fixed according to merit. The person selected will be appointed on contract for a period of si years, which would be confirmed after an initial period of two years of satisfactory service. Qualificatio and experience are relaxable in the case of candidates otherwise found suitable for the post.

Age limit: Below 50 years, relaxable in special cases. Scientists/technologists interested may obtain tw copies of standard proforma for sending their *curriculum vitae* from the Chief (Administration), Council Scientific and Industrial Research, Rafi Marg, New Delhi 110001 on or before 17 February 1981. The can also obtain a brochure on the aims and objects and the latest annual report of the institut Completed *curriculum vitae* proforma must be received in this office on or before 17 March 198 Candidates who have already applied in response to CSIR Advertisement No. 29/78 need not appl again.

Canvassing in any form and/or bringing in any influence, political or otherwise, will be treated as disqualification for the post.

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